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(56) Documents Cited

GB 1311228 A

US 5331260 A

US 5291103 A

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## (54) Control of sliding closure elements for vehicles

(57) A control system for a sliding closure element adjacent a seat of a vehicle comprises a motor 28 for opening and closing the element, a switch 16 for operating the element, and trap detection means 30 for detecting an obstacle to movement of the element. Control means 10 respond to the detection of an obstacle to movement of one of the elements by performing an anti-trap function, stopping closure of the element, but respond to an override signal to override the anti-trap function. The override means are situated so as to be operable only from a seat other than that to which the closure element is adjacent. Preferably the system controls the windows and sunroof of the vehicle, with switches 16, 18, 20, 32 for motors 28, 22, 34 being operable from the front seats and also used to over-ride the anti-trap function of the rear windows. Audible and visual warnings may be given while the anti-trap function is being overridden.

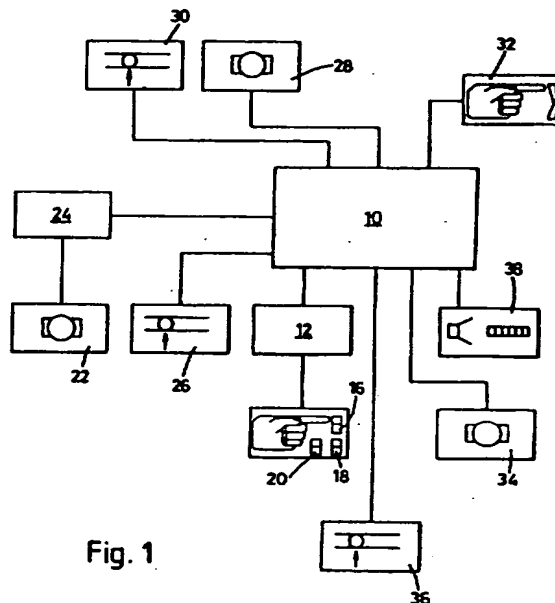


Fig. 1

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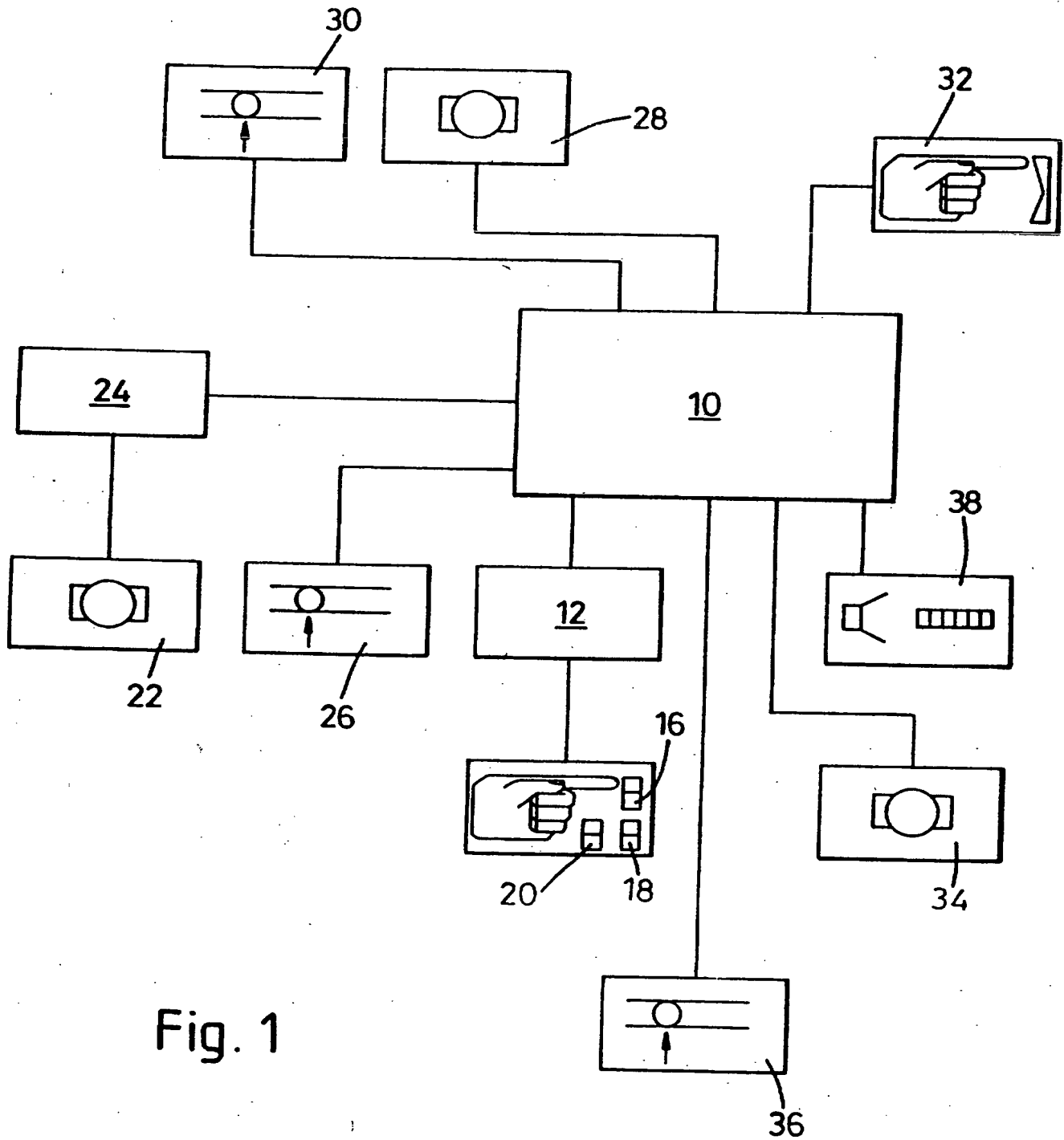


Fig. 1

Control of Sliding Closure Elements for Vehicles

The present invention relates to the control of vehicle windows and sunroofs which are opened and closed by electric motors.

It is known for such sliding closure elements to be operated by a system which includes an anti-trap function. This detects when the element has encountered an obstacle during closure and stops the closure to prevent damage to the obstacle, which may, for example, be part of a human body. The operation of such systems is well known and will not be described in detail.

It is a problem with such systems that the anti-trap function can come into operation when it is not desired. This may be because the window or sun roof has become iced up, or because the obstacle is an intruder to the vehicle who the driver is trying to shut out. In order to overcome this problem it is known to provide an over-ride switch which can be used to over-ride the anti-trap function and close the window. However this can reduce the efficacy of the system because if the over-ride switch is operated unintentionally, particularly by a child playing in the vehicle, that child can be trapped by the window.

Accordingly the present invention provides a vehicle having a plurality of seats, a sliding closure element adjacent one of said seats, control system for the sliding closure element comprising a motor for opening and closing the closure element, a control unit for controlling the motor, an actuating switch for the motor, and trap

detection means for detecting an obstacle to movement of the element, wherein the system includes over-ride means for producing an over-ride signal, the control means being arranged to respond to the detection of the obstacle by  
5 performing an anti-trap function, but to respond to the over-ride signal to over-ride the anti-trap function, and the over-ride means being situated so as to be operable from one or more seats other than said one seat.

This means that a person sitting in said one seat  
10 cannot operate the over-ride means, for example because they cannot reach it, at least when seated normally.

Preferably said one seat is a rear seat and the over-ride means is only operable from one or more front seats of the vehicle.

15 The over-ride means may be mounted, for example, on a front door or on a centre console between the front seats.

The switch may also be operable only from one or more seats other than said one seat.

The switch may be of any type, e.g. a rocker switch or  
20 a push-button switch.

The over-ride means may comprise the actuation switch. For example the over-ride signal may be produced by operating the switch within a predetermined period of the detection of the obstacle.

25 Alternatively the actuation switch may be operable from said one seat and the over-ride means may be separate from

the actuation switch. For example where the element is a rear window of the vehicle said switch may be mounted on the rear door and the further switch may be mounted on a centre console between the front seats.

5 Preferred embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a schematic diagram of a system according to the invention.

10 A vehicle has two front seats two outside rear seats and a centre rear seat. It also has two front windows adjacent the front seats and two rear windows adjacent the outside rear seats. A central control unit 10 is provided which has overall control of the opening and closing of  
15 all four windows and the sunroof of a vehicle. Communicating with the central control unit 10 is a centre console outstation 12 which is situated between the front seats of the vehicle, and provides control for all four windows and the sunroof for the driver and front passenger  
20 of the vehicle. The centre console outstation 12 has a left hand rear window switch 16, a left hand front window switch 18 and a sunroof switch 20, and right hand window switches (not shown). A left hand front window motor 22 is connected to the central control unit 10 via a left hand  
25 front door outstation 24, and a left hand front window trap sensor 26 is also connected to the central control unit 10. A window motor 28, trap sensor 30, and window switch 32, all for the left hand rear door, are also connected to the central control unit 10, as are a motor

34 and trap-detector 36 for the sunroof. Corresponding motors, switches and sensors are included for the right hand front and rear windows, but these are not shown on the diagram for the sake of clarity. Finally, a message  
5 centre 38 for providing audible and visual messages to the driver of the vehicle is also connected to the central control unit 10.

During normal operation of the left hand rear window from the centre console, the switch 16 can be moved to a  
10 window-up or window-down position to raise or lower the window. When it is moved to the window-up position the central control unit measures the length of time it is held there, and if it is for less than a predetermined period the central control unit 10 controls the motor 28  
15 to close the window completely. Otherwise the window is simply raised for as long as the switch is pressed. If, while the window is being raised, the trap detector 30 senses that an obstacle is preventing the window from moving, the control unit carries out an anti-trap routine  
20 whereby the motor 28 is reversed to move the window away from the obstacle, and then stopped. This prevents the obstacle from being damaged or hurt. However, in some circumstances the person operating the window may wish to over-ride the anti-trap routine and continue with closing  
25 the window. This may be because the window is getting stuck because of ice, or because the obstacle is an intruder trying to gain access to the vehicle. Therefore if, following the detection of an obstacle during normal closing of the window, the switch 16 is released and then  
30 depressed again to the window-up position within a predetermined period of ten seconds from the detection of

the trap, the central control unit 10 recognizes this as an over-ride signal and powers the motor 28 in the direction to close the window, ignoring the signals from the trap detector 30 that an obstacle is being detected.

5 While the anti-trap function is being over-ridden the central control unit 10 causes the message centre to issue both audible and visual warnings to reduce the chances of the over-ride function being operated inadvertently. Similarly, if, following the detection of an obstacle  
10 during automatic closing of the window, the switch 16 is again moved to the window-up position within a predetermined period of ten seconds from the detection of the trap, then the central control unit will recognize this as an over-ride signal and act accordingly.

15 Since the centre console cannot be easily reached by a person in the left hand rear seat, such a person is unlikely to operate the over-ride function to trap themselves in the window.

If the rear window is being operated from the switch 32  
20 on the rear door, then the anti-trap over-ride function is not available to the person sitting in the rear seat and operating that switch. This is to prevent the risk of misuse by children in the rear seats and the resulting danger.

25 The operation of the front window using the motor 22, the trap-detector 26 and the switch 18 on the centre console is the same as for the rear window and will not be described in detail. Similarly the operation of the

sunroof using the sunroof switch 20 on the centre console, the motor 34 and the trap-detector 36 is also the same.

It will be understood that the nature of the over-ride signal is not critical, and could, for example, require 5 more than one depression of the switch.



CLAIMS

1. A vehicle having a plurality of seats, a sliding closure element adjacent one of said seats, a control system for the sliding closure element comprising a motor for opening and closing the closure element, a control unit for controlling the motor, an actuating switch for the motor, and trap detection means for detecting an obstacle to movement of the element, wherein the system includes over-ride means for producing an over-ride signal, the control means being arranged to respond to the detection of the obstacle by performing an anti-trap function, but to respond to the over-ride signal to over-ride the anti-trap function, and the over-ride means being situated so as to be operable only from one or more seats other than said one seat.
2. A vehicle according to claim 1 wherein said one seat is a rear seat and the over-ride means is only operable from one or more front seats of the vehicle.
3. A vehicle according to claim 2 wherein the over-ride means is mounted on a front door of the vehicle.
4. A vehicle according to claim 2 wherein the over-ride means is mounted between the front seats.
5. A vehicle according to any foregoing claim wherein the actuation switch is operable only from one or more seats other than said one seat.

6. A vehicle according to claim 5 wherein the over-ride means comprises the actuation switch.
7. A vehicle according to any one of claims 1 to 4 wherein the actuation switch is operable from said one seat.
8. A system according to any foregoing claim wherein the over-ride signal is caused by operating the over-ride means within a predetermined period of the detection of the obstacle.
9. A system according to any foregoing claim further comprising message producing means for producing a warning message while the anti-trap function is being over-ridden.
10. A vehicle substantially as hereinbefore described with reference to the accompanying drawing.

<b>Patents Act 1977</b> <b>Examiner's report to the Comptroller under Section 17</b> <b>(The Search report)</b>		<b>Application number</b> <b>GB 9515000.9</b>
<b>Relevant Technical Fields</b>  (i) UK Cl (Ed.N)      E2M (MAB, MPRVW); G3N (NGCA4B) (ii) Int Cl (Ed.6)      E05F (15/00, 15/06, 15/16, 15/18, 15/20); B60J (1/12, 1/16, 1/17, 7/057)		<b>Search Examiner</b> <b>MRS GILL WHITFIELD</b>
<b>Databases (see below)</b> (i) UK Patent Office collections of GB, EP, WO and US patent specifications.  (ii) ONLINE: WPI		<b>Date of completion of Search</b> <b>5 SEPTEMBER 1995</b>
		<b>Documents considered relevant following a search in respect of Claims :-</b> <b>1 TO 10</b>

**Categories of documents**

<b>X:</b>	Document indicating lack of novelty or of inventive step.	<b>P:</b>	Document published on or after the declared priority date but before the filing date of the present application.
<b>Y:</b>	Document indicating lack of inventive step if combined with one or more other documents of the same category.	<b>E:</b>	Patent document published on or after, but with priority date earlier than, the filing date of the present application.
<b>A:</b>	Document indicating technological background and/or state of the art.	<b>&amp;:</b>	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
Y	GB 1311228 A	(PORSCHE) see especially safety switch 17	1 to 9
Y	US 5331260 A	(AHMED) see especially column 1 lines 16 to 20; column 6 lines 3 to 7; Figure 1, 2	1 to 9
Y	US 5291103 A	(AHMED) see especially column 1 lines 15 to 27; Figures 1, 2	1 to 9
Y	US 4709196 A	(MIZUTA) see especially column 5 line 64 to column 6 line 19	1 to 9
Y	US 4686598 A	(HERR) see especially column 5 lines 25 to 31	1 to 9

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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